

REMARKS

Favorable reconsideration is respectfully requested.

Upon entry of the above amendment, the claims will be 7 to 15.

The above amendment is responsive to points set forth in the Official Action.

The above amendment presents a new set of claims in which new claim 7 replaces previous claim 1. Support is evident, for example, from page 3, lines 20 to 29 of the present specification.

Support for new claim 8 is evident from page 3, lines 15 to 18 of the present specification.

Support for new claim 9 which replaces previous claim 3, can be seen from page 3 of the present specification.

Support for new claim 10 is evident from page 3, line 35 as well as Example 1.

Support for new claims 12 to 15 will be seen from previous claims 3 to 6, respectively.

The significance of the new claims will be discussed in further detail below.

With regard to the rejection in Official Action paragraph 1, the present claims no longer recite "obtained and/or obtainable". New claim 11 only recites the term "obtained".

With regard to the rejection in Official Action paragraph 2, the present claims do not recite "a small pH of 5". The previous recitation of "5" was a typographical error.

In Official Action paragraph 3, the Markush terminology has been clarified along the lines suggested by the Examiner.

With regard to Official Action paragraph 5, the term "effective" no longer appears because it is implied and hence is redundant.

Claims 2 to 6 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mallya et al. (U.S. 6,489,387 B2) in view of Gerst et al. (U.S. 6,254,985 B1).

Further, claim 1 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Mallya et al. (U.S. 6,489,387 B2) in view of Gerst et al. (U.S. 6,254,985 B1) and Phan et al. (U.S. 6,096,824).

These rejections are respectfully traversed.

Applicants have found that factors such as the choice of surfactant and type of monomers used to prepare the aqueous dispersion of the acrylic polymer will significantly affect the

properties of the final PSA film when it is coated on a substrate in a non-predictable and therefore non-obvious way.

Surfactant properties are especially important for the present invention where it is desired to produce a dry PSA film which is resistant to whitening when the substrate to which it is applied is exposed to water. Water-whitening resistance is highly desirable for many PSA applications, for example where aqueous PSAs are used to attach transparent filmic labels to articles such as bottles (which may be immersed in water e.g. an ice bath for cooling). The aesthetic appeal of a "no label" look where the artwork seems to be printed directly on an article is severely affected if the PSA behind the clear label goes cloudy.

Water-whitening occurs because the polymer network of the film is disrupted as water is absorbed, creating pockets of the right dimensions to scatter light and thus turn the PSA film white. Surfactants can interact with the polymer network to resist disruption by water molecules and so the nature of the surfactant will affect water-whitening resistance. Applicants have tested many surfactants and few of them lead to improved water-whitening resistance. The nature of the polymer network is also important and its properties are affected by the monomer composition and also process conditions. Good water-whitening resistance is therefore very difficult to achieve as a complex and subtle balance of factors contributes to the effect. A skilled person would not expect to be able to simply replace one element in a known PSA formulation or process with another different known element in a different formulation and expect to obtain similar results.

(Process steps) - Non-obviousness over Mallya plus Gerst plus Phan

In the PCT written opinion, there was some confusion about the nature of steps (c) and (d) of claim 1 (now claim 7). Claim 7 (previous claim 1) has also been amended to emphasize it is only a portion of the pre-emulsion from step (b) which is mixed with the water 'stock solution' from step (c) (see page 4, lines 35 to 36 of Example 1 of the present invention). In step (d) further pre-emulsion from step (b) is added to the mixture from step (c). (See Example 1, page 4, lines 36 to 37).

Novelty

The present invention has been amended so it is novel over Mallya which describes PSA made with different surfactants (and also no styrene).

Non-obviousness

Mallya teaches use of different surfactants to the ethoxylated alkyl phenol sulfates (such as Hitanol BC2020). Given the difficulties of achieving good water-whitening resistance, a reader of Mallya would not be motivated to select a different surfactant to those described therein and would not arrive at the process of the invention.

Gerst also does not teach use of ethoxylated alkyl phenol sulfates and for similar reasons, a person skilled in the art would not be motivated to modify the processes described therein. In particular, Gerst teaches that it is important to add a hydrazine derivative with at least two hydrazine residues per molecule. This further deters a skilled reader from arriving at the process of the present invention.

Non-obviousness over Mallya plus Gerst

The Examiner acknowledges that the present claims are novel over Mallya who, for example, does not disclose styrene monomer. In fact, Mallya teaches use of a very specific surfactant mixture:

" . . . a nonionic surfactant containing at least 8 moles (mol) ethylene oxide per mole (mol) and an ionic [sic] surfactant containing less than about 10 mols ethylene oxide per mol, preferably in which the weight ratio of nonionic surfactant to anionic surfactant is at least one-to-one (at least 1:1) . . ." (See col. 2, lines 30 to 35).

Mallya also teaches away from using other surfactants and in col. 5, lines 36 to 57 it states:

"The surfactant systems employed during polymerization must be compatible with the whole emulsion polymer, i.e., the predominantly hydrophobic alkyl acrylate inner layer and the hydrophilic copolymer outer layer surrounding the inner layer, and thereby determining water whitening resistance of the coated film product. The surfactant(s) employed during polymerization are also important in stabilizing the particles during polymerization and in storage."

We have found that with anionic surfactants, the level of ethoxylation has to be about 10 moles per mole surfactant or less, preferably 4 moles (ethylene oxide units per molecule) or less for good water whitening resistance. When the average moles of ethylene oxide is too high, opacities tend to be high. It was also observed that even when good, the opacities are not reproducible when an anionic surfactant was the only surfactant. That is, repeated film draw downs from the same emulsion gave desirably low opacities at times and undesirably high opacities at other times.

Other anionic surfactants with higher levels of ethylene oxide (moles per mole) may be used to stabilize the emulsion particles during polymerization or other reasons but do not impart resistance to water whitening."

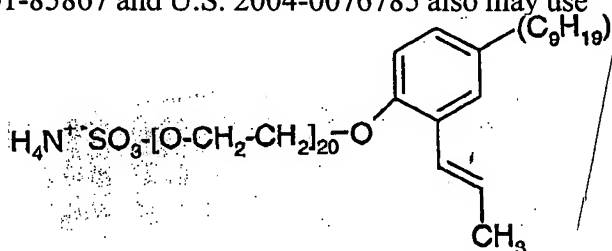
This teaches directly away from use of the surfactants of the present invention (Hitanol contains 20 moles of ethylene oxide per molecule).

Additional Prior Art

WO 01-85867 (also WO 00/61670; U.S. 6,861,152; U.S. 6,590,031; and U.S. 6,359,092)
U.S. 2004-0076785.

With the amended claims an Information Disclosure Statement is submitted herewith to disclose the above patent family (assignee Ashland) which describe various aspects of a process for making water-whitening resistant PSA from acrylic monomers (including styrene) and optionally an ethoxylated alkyl phenol sulfate surfactant but with a redox type polymerization initiator (such as peroxides and the like). The present claims recite a process that uses a thermal initiator to begin polymerization. Comparative Example (Comp A) in the present application was made with a redox initiator and shows the advantages of the claimed invention (using a thermal initiator) over a similar PSA made with a redox system.

The PSAs are disclosed by Ashland in WO 01-85867 and U.S. 2004-0076785 also may use the surfactant Hitanol BC10.



However, the preferred surfactant for use in the present invention is Hitanol BC20 where the alkoxy ether chain is twice as long as that for Hitanol BC10 described by Ashland (i.e. OCH_2CH_2 is repeated 20 times not 10 - 'n' = 20). The disclosure of Ashland teaches away from use of such longer chain length surfactants which are not specifically mentioned.

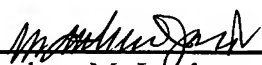
Hence, the present invention is not obvious in view of the above-discussed prior art.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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